

L.D. del.  
M.P. Parker lith.

Parker & West imp.

LIMNOTROCHUS & CHYTRA.

WITH APORRHAIIS, NASSOPSIS, PLEUROTOMARIA, & TROCHUS.



Notes on the Brain of *Macroscelides* and other Insectivora.

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[Read 1st May, 1902.]

My friend Dr. Robert Broom has recently discovered that the organ of Jacobson and its cartilages in the Elephant-Shrew present a peculiarly close similarity to the corresponding parts in the Marsupialia, and has moreover found\* metatheroid features in the skeleton of *Macroscelides* in addition to those previously recorded by Kitchen Parker. It seemed to him that it would be of considerable interest to submit to careful examination the other parts of the body which present distinctive features in the Marsupialia. Accordingly he has kindly sent me the heads of an adult and a foetal *Macroscelides proboscideus*, and asked me to make a report upon them.

The heads had been simply placed in spirit, so that the brains were not in a condition altogether favourable for histological study. In fact the foetal brain was too soft to permit of anything more than a study of the configuration of its surface. The adult brain, however, was sufficiently firm to be cut in paraffin. The sections were stained with lithium-carmin.

As the presence or absence of metatheroid features can in almost all mammalian brains be detected by the naked eye, I first submitted the brain to a thorough examination both by this means and with the help of a lens. I then split it in the mesial sagittal section and studied the mesial surface in the same way; and as many points still needed elucidation, I cut a series of coronal sections of one hemisphere and dissected the other.

The brain of *Macroscelides* has been figured from the dorsal aspect by Peters †; and its general features need not be described in detail, since they differ to no great extent from those of *Talpa*, which have been so thoroughly described in Ganser's classic monograph ‡.

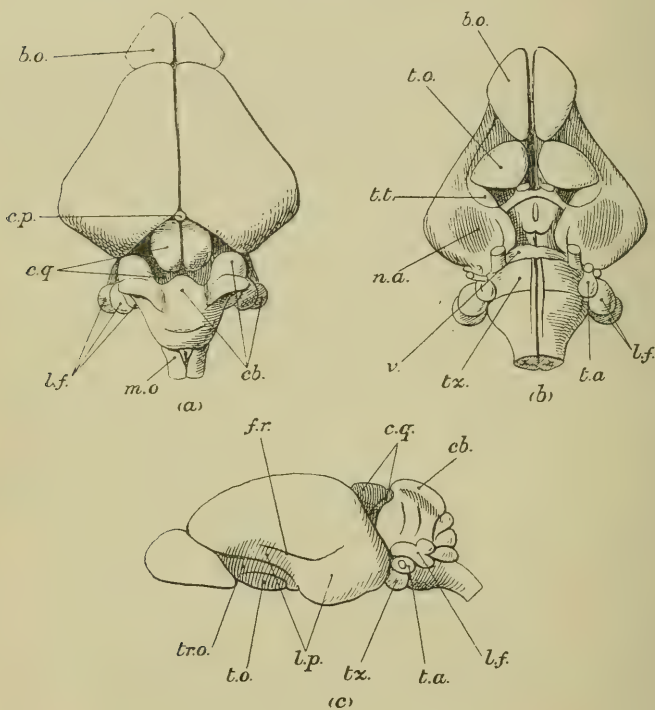
\* Proc. Zool. Soc. 1902, vol. i., March, 18th.

† Peters, 'Reise nach Mossambique,' Zool. i. Säugethiere, pl. xxiv. fig. 13. Berlin, 1852.

‡ Vergleich. Anat. Studien. "Ueber das Gehirn d. Maulwurfs," Morph. Jahrb. Bd. vii. p. 591 (1881).

The large projecting olfactory bulbs recall those of the Marsupial *Perameles*. The features of the base of the brain—the large tubercula olfactoria, the tracti olfactorii and their large tubercles, the peculiar flattening of the nuclei amygdalæ,

Fig. 1.



*Macroselides proboscideus*: the brain,  $\times 2$ .

(a) Dorsal aspect. (b) Ventral aspect. (c) Left lateral aspect.

*b.o.*, bulbus olfactorius. *cb.*, cerebellum. *c.q.*, corpora quadrigemina. *f.r.*, fissura rhinalis. *l.f.*, lobus flocculi. *l.p.*, lobus pyramidalis. *m.o.*, medulla oblongata. *n.a.*, nucleus amygdalæ. *t.a.*, tuberculum acusticum. *t.o.*, tractus olfactorius. *t.t.*, tuberculum tractus olfactorii. *tx.*, trapezium. *v.*, pons Varolii.

the small pons Varolii, and the large trapezoid bodies—all closely resemble those which are found equally in the Insectivora, Polyprodont Marsupials, and the Dasypodidæ. The peculiar lateral extension of the pyriform lobes of the hemispheres into

a distinct angle occurs also in *Erinaceus*, *Talpa*, and *Perameles*. So far as the shape of the cerebral hemispheres, and especially also that of the floccular lobes of the cerebellum, is concerned, the brain more closely resembles that of *Perameles* than that of the Insectivora. At the same time, distinctions of this kind have little if any ordinal value.

The rhinal fissure is incomplete, being intermediate in this respect between *Erinaceus* and *Perameles*.

The caudal margin of each hemisphere (fig. 1 a) consists of two limbs of equal length meeting at an angle of slightly more than  $90^\circ$ . A large lozenge-shaped space is left between the mesial half of each hemisphere and the cerebellum, and in this the pineal body, the whole of the anterior and a considerable part of the posterior pair of corpora quadrigemina are exposed. Such a complete uncovering of the mid-brain is rare in mammals. A much slighter degree of uncovering occurs in the Marsupial *Dasyurus* and some of the smaller Dasyuridæ. A similar condition occurs in the Insectivore *Centetes*, but, as Forsyth Major has pointed out, it is probably due to secondary retrogressive change.

It is strange to find a similar exposure of the mid-brain in the aberrant *Galeopithecus*\*—in a brain possessing deep and well-defined calcarine, intercalary, suprasylvian, orbital, and pseudosylvian sulci. It also occurs in most of the Microchiroptera.

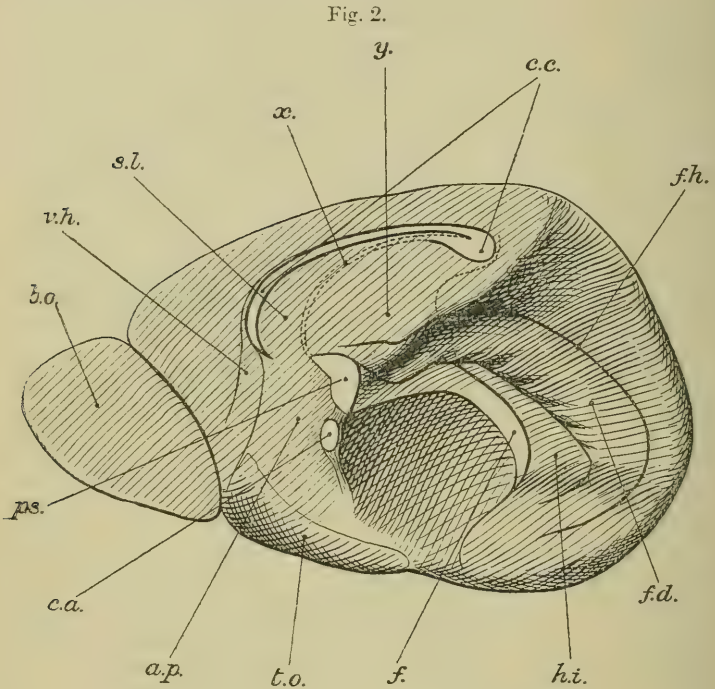
The cerebellum is very simple and closely resembles that of *Perameles*. This is of little systematic importance, because the mere wiping-out of some of the cerebellar fissures and the elongation of the floccular lobe in *Erinaceus* would produce the *Perameles*-type.

The only features of crucial importance in attempting to distinguish the brain of an Insectivore from that of a Polyprotodont Marsupial are those of the cerebral commissures and the hippocampus. The Marsupial has a small dorsal commissure which is derived wholly from the fornix, whereas the upper commissure of the Insectivore is derived partly from the fornix and partly

\* For some excellent specimens I am indebted to the kindness of Dr. Charles Hose of Borneo. The only accounts of this brain, viz., those of Gervais (*Journal de Zoologie*, tome i., 1872) and Leche (*Kongl. Sv. Vet.-Akad. Handl. Bd. xxi. p. 48*, Stockholm, 1886), are far from perfect. I have given fuller information concerning this brain in my forthcoming *Catalogue of the Collection of Brains in the Royal College of Surgeons' Museum*.

from the neopallium, the latter moiety constituting the corpus callosum.

On the mesial surface of the hemisphere of *Macroscelides* there is a most extraordinary condition (fig. 2).



*Macroscelides proboscideus*: right cerebral hemisphere,  
mesial aspect,  $\times 6$ .

*c.a.*, commissura anterior. *c.c.*, corpus callosum. *f.*, fimbria. *f.d.*, fascia dentata. *f.h.*, fissura hippocampi. *h.i.*, hippocampus inversus. *ps.*, psalterium. *s.l.*, septum lucidum. *v.h.*, vestigia hippocampi. *y.*, area of subsplenial hippocampal flexure. *x.*, line of probable connection between the psalterium and splenium. Other references as for figure 1.

In the lamina terminalis there is a relatively (*i. e.* in comparison with that of Marsupials) small anterior commissure (*c.a.*), and yet, above it, a typically metatheroid psalterium (fornix-commissure, *ps.*) of a crescentic shape such as occurs in *Perameles*, *Notoryctes*, *Didelphys*, and *Myrmecobius*. The hippocampal formation (fig. 2, fascia dentata) extends forward on to